

## Completing the menu: addition of *Scinax cruentommus* and *Scinax cf. garbei* (Anura: Hylidae) to the diet of *Trachops cirrhosus* (Chiroptera: Phyllostomidae) in Central Amazon

The Neotropical fringe-lipped bat (*Trachops cirrhosus*) is a medium-sized phyllostomid bat (forearm length 55–65 mm) found in dry and moist forests extending from southern Mexico to southern Brazil (Arita 1993, Williams & Genoways 2007). The species is easily identified by its prominent cylindrical, papilla-like projections on the lips and muzzle (Cramer et al. 2001, Williams & Genoways 2007). Together with the common big-eared bat *Micronycteris microtis*, the stripe-headed round-eared bat *Tonatia saurophila*, the greater spear-nosed bat *Phyllostomus hastatus*, the big-eared woolly bat *Chrotopterus auritus*, the spectral bat *Vampyrum spectrum* and the two species of bulldog bat - genus *Noctilio* - this is one of the few Neotropical bats known to capture and prey on vertebrate species (Norberg & Fenton 1988, Simmons 2005, Altringham et al. 2011, Santana et al. 2011).

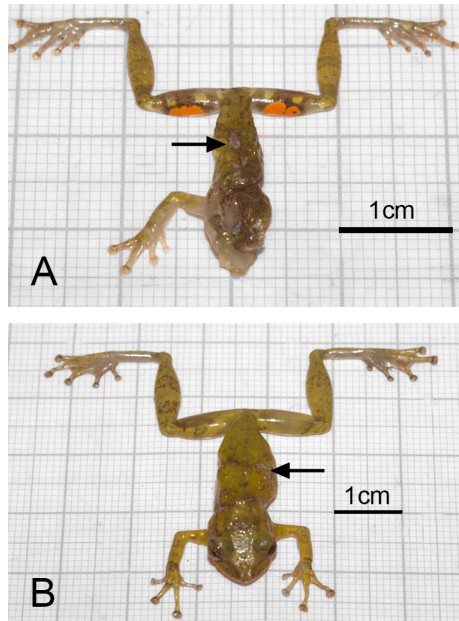
Fringe-lipped bats are known mostly for their frog-eating habits, but are omnivorous and feed mainly on insects (Bonato et al. 2004). In addition to anurans, these bats consume a wide range of other small vertebrates such as lizards (Goodwin & Greenhall 1961, Pine & Anderson 1979, Whitaker & Findley 1980), birds (Bonato et al. 2004, Rodrigues et al. 2004), and mammals (Peracchi et al. 1982, Arias et al. 1999, Ferrer et al. 2000, Bonato et al. 2004), including other bats (Bonato & Facure 2000). Fruits (Whitaker & Findley 1980, Humphrey et al. 1983, Bonato et al. 2004) and snails (Bonato et al. 2004) have also been reported as minor constituents of the species' diet.

Interactions between *T. cirrhosus* and the Central American túngara frog *Engystomops* (formerly *Physalaemus*) *pustulosus* have been extensively studied (Barclay et al. 1981, Tuttle & Ryan 1981, Tuttle et al. 1982, Jones et al. 2013, Surlykke et al. 2013). However, despite considerable literature on the evolutionary arms-race between both species (e.g. Tuttle & Ryan 1981, Halfwerk et al. 2014), only two other anurans have been described as *T. cirrhosus* prey, namely the Panama cross-banded treefrog *Smilisca sila* (Nunes 1988) in Central

America and the slender-legged treefrog *Osteocephalus oophagus* in Central Amazon (Rocha et al. 2012). Bonato et al. (2004) analyzed the diet of 102 *T. cirrhosus* individuals from the Brazilian Amazon and the Atlantic forests, revealing that almost 20% of the remains in the bats' intestinal tracks belonged to amphibian prey. However, remains could only be identified to Order level. A report of the Manaus slender-legged treefrog *Osteocephalus taurinus* being captured by bats in the Venezuelan Amazon may also be related to *T. cirrhosus*, however, the authors were unable to identify the predator species in question (Amézquita & Hödl 2004). In this study, we report two additional predation events of *T. cirrhosus* upon Central Amazonian hylids.

Observations were made on 22 May 2013 at the Florestal reserve of the Biological Dynamics of Forest Fragments Project (BDFFP), located ~80 km north of Manaus (2°23'18.65"S, 59°50'57.84"W), Central Amazon, Brazil. The reserve is located in an area of *terra firme* rainforest characterized by high levels of tree species richness (often exceeding 280 species ha<sup>-1</sup>) (Oliveira & Mori 1999) and a forest canopy height between 30 and 37 m, with emergent trees reaching 55 m (Mesquita et al. 1999). Rainfall annually ranges from 1900 to 3500 mm, with a dry season spanning the months of June through October (Laurance et al. 2011). Bats were sampled using 14 ground-level mist nets (12 × 2.5 m, 16-mm mesh, ECOTONE, Poland) stretched along 2 perpendicular transects roughly 100 m long, and 3 canopy-mist nets (3 × 12 m, 16-mm mesh, ECOTONE, Poland). Nets were opened at 06:00 pm, deployed for six hours and visited approximately every 20 minutes.

At 10:20 pm an adult male *T. cirrhosus* (forearm 61.6 mm; weight 39.5.6 g) was captured in a ground-mist net with a treefrog in its mouth. After disentangling the bat, the frog was collected and identified as a juvenile of *Scinax cf. garbei* (SVL 20 mm; Fig. 1.A). Soon after, at 11:00 pm, a second *T. cirrhosus*, a lactating female (forearm 63.5 mm; weight 36.2 g), was also captured in a nearby mist-net with another hylid, identified as an adult of *Scinax cruentommus* (SVL 30 mm; Fig. 1.B). Both bats were marked with subcutaneous PIT-tag transponders (PIT-tag codes: male = 00071A3730; female = 000708BEDE) and released soon after being captured. Treefrogs were deposited at the herpetology collection of the National Institute of Amazonian Research (INPA) in Manaus, Amazonas, Brazil (*Scinax cf. garbei* catalogue number INPA-H 34283; *S. cruentommus* catalogue number



**Figure 1.** Remains of the *Scinax* cf. *garbei* (INPA-H 34283) (A) and *Scinax cruentommus* (INPA-H 34284) (B) individuals preyed on by *Trachops cirrhosus* at the Florestal reserve of the Biological Dynamics of Forest Fragments Project. Arrows point to teeth mark bites.

INPA-H 34284). During the night of the reported events, mist-netting was conducted in close proximity (~100 m) to a shallow temporary pond, located under dense tree canopy and from which intense amphibian vocal activity could be heard. Within 3 hours (from 9:00 pm to 12:00 pm) a total of 5 *T. cirrhosus* were mist-netted, a number unmatched in any equal time period during 3 years of field-work in the area (culminating in the capture of more than 7 000 bats).

*Scinax* treefrogs occur in nearly all tropical and subtropical habitats from southern Mexico to eastern Argentina and represent the second largest genus within the subfamily Hyliinae (Faivovich 2002), harbouring more than 110 species (Frost 2015). Post-metamorphic *Scinax* species have been reported as prey of several vertebrate (Toledo et al. 2007) and invertebrate (Toledo et al. 2005) taxa. However, to date no trophic interaction between a mammal species and *Scinax* spp. has been reported.

The fringe-lipped bat is one of the most common gleaner bat species within Central Amazon, yet despite being locally abundant, knowledge of its feeding habits is extremely scarce. The events

here reported add two new prey species to the diet of *T. cirrhosus* and contribute to a better understanding of resource use and partitioning among tropical chiropteran species.

**Acknowledgments.** We thank Christoph F.J. Meyer, Paulo Bobrowiec and Jorge M. Palmeirim for their assistance during all phases of the project, the BDFFP management team for logistic support and Sasha Vasconcelos for yet another English revision. RR and AB are grateful to Albertina Lima, Ariane Silva and Juliana Vieira for providing the contact of MG and the anonymous reviewers for helpful comments. Financial support was provided by the Portuguese Foundation for Science and Technology through the grants PTDC/BIA-BIC/111184/2009, SFRH/BD/80488/2011 and PD/BD/52597/2014 and this is publication 674 in the Technical Series of the BDFFP.

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**Key words:** amphibians, bats, Brazil, Amazonia, diet, trophic interaction.

Article No.: e157501

Received: 02. January 2014 / Accepted: 26. June 2015

Available online: 31. May 2016 / Printed: June 2016

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